

A-5. TABLES FOR REPTILES AND AMPHIBIANS

***** SNAPPING TURTLE *****

*** NORMALIZING AND CONTACT RATE FACTORS ***

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
BODY WEIGHT (AND LENGTH)													
Congdon et al. 1986	A	M	-	-	4,871	594	SE g			15	S Carolina	bay, marsh, pond	
	A	F	-	-	4,831	931	SE g			6			
	J	B	-	-	664	59	SE g			68			
Congdon et al. 1986	A	M	-	-	4,159	277	SE g			97	Michigan	bay, marsh, pond	
	A	F	-	-	3,160	197	SE g			80			
	J	B	-	-	798	68	SE g			128			
Congdon & Gibbons 1985	A	F	L	-	2,856		g			4	N Carolina	NS	
	A	F	L	-	(173)		mm plastron						
Ernst & Barbour 1972	A	F	B	SU			g	4,020	10,500		NS	NS	Discusses work of Hammer 1969.
Galbraith et al. 1988	A	M	-	SU	10,500	2,850	SD g			17	Ontario, CAN	large oligotrophic lake	
	A	F	-	SU	5,240	850	SD g			26	1984-85		
	J	B	-	SU	1,150	800	SD g			8			
Galbraith et al. 1988	A	M	-	SU	9,340	2,150	SD g			5	Ontario, CAN	small oligotrophic lake	
	A	F	-	SU	4,780	860	SD g			4	1984-85		
	J	B	-	SU	2,600		g			1			
Galbraith et al. 1988	A	M	-	SU	5,520	2,230	SD g			47	Ontario, CAN	eutrophic pond	
	A	F	-	SU	5,030	1,120	SD g			24	1984-85		
	J	B	-	SU	1,400	200	SD g			7			
Gerholdt & Oldfield 1987	-	-	-	SP	29,600		g			1	n Minnesota 1986	Popple River, Squaw Lake	Mass at the time of capture.
Graham & Perkins 1976	J	-	-	-	328.4		g (118 mm)			1	Massachusetts	polluted marsh	Weight and carapace length relationship. Ages not specified.
	J	-	-	-	444.2		g (127 mm)			1			
	J	-	-	-	531.4		g (134 mm)			1			
	J	-	-	-	1,026.6		g (167 mm)			1			
	J	-	-	-	1,508.4		g (192 mm)			1			
	J	-	-	-	2,362.1		g (220 mm)			1			
Hammer 1969	A	-	-	-	7,580		g				S Dakota	marsh	
Hammer 1969	A	M	-	-	9,435		g	2,495	18,190	37	S Dakota	marsh	LaCreek Refuge.
	A	F	-	-	7,348		g	4,082	12,250	290	1964-67		
Hammer 1969	A	F	-	-			g	4,080	10,660	311	S Dakota 1964-67	marsh	Mass of nesting females. LaCreek Refuge.

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Kiviat 1980	A	B	-	-	6,000		g			46	New York 1973	fresh tidal wetland	
Lagler & Applegate 1943	A	-	-	SU	1,873		g (197 mm)			2	lower Michigan	lakes, ponds, streams	Weight and carapace length relationship. Ages not specified.
	A	-	-	SU	3,357		g (248 mm)			25			
	A	-	-	SU	6,033		g (298 mm)			12			
	A	-	-	SU	9,979		g (349 mm)			2			
	A	-	-	SU	13,608		g (375 mm)			1			
Lonke & Obbard 1977	A	F	-	-	6,400	1,430 SE	g	4,300	11,100	43	Ontario, CAN 1972-74	Lake Sasajewun	
BODY LENGTH													
Congdon et al. 1986	A	M	-	-	187.5	3.38 SE	mm plastron			97	Michigan	bay, marsh, pond	
	A	F	-	-	184.2	3.08 SE	mm plastron			80			
	J	B	-	-	100.2	3.11 SE	mm plastron			128			
Congdon et al. 1986	A	M	-	-	193.9	7 SE	mm plastron			21	S Carolina	bay, marsh, pond	
	A	F	-	-	195.8	9.88 SE	mm plastron			8			
	J	B	-	-	98.7	3.11 SE	mm plastron			82			
Congdon et al. 1986	A	M	-	-	253.4	4.97 SE	mm carapace			97	Michigan	bay, marsh, pond	
	A	F	-	-	238.3	3.77 SE	mm carapace			80			
	J	B	-	-	132.8	4.22 SE	mm carapace			128			
Gibbons 1968	1	B	-	-	61.6	4.5 SD	mm carapace	54	66	6	Michigan 1965	polluted river	Ages in years. Numbers represent average carapace length at each age.
	2	B	-	-	102.2	5.8 SD	mm carapace	83	108	6			
	3	B	-	-	136.8	9.4 SD	mm carapace	124	145	6			
	4	B	-	-	168.2	14.2 SD	mm carapace	146	184	6			
	5	B	-	-	198.4	13.7 SD	mm carapace	177	211	6			
	6	B	-	-	222.2	12.9 SD	mm carapace	204	238	6			
Hammer 1969	A	M	-	-	246		mm plastron	165	305	37	S Dakota	marsh	LaCreek Refuge.
	A	F	-	-	247		mm plastron	197	284	290	1964-67		
Hammer 1969	A	F	-	-			mm carapace	254.0	371		S Dakota 1964-67	marsh	Carapace length of nesting females. LaCreek Refuge.
Kiviat 1980	A	F	BR	SU	262.4		mm carapace	216	330	54	New York 1974	fresh tidal wetland	
Lonke & Obbard 1977	A	F	-	-	281	24.6 SE	mm carapace	234.0	356.0	47	Ontario, CAN 1972-74	Lake Sasajewun	
Mosimann & Bider 1960	A	M	-	SU			mm carapace	210	393	12	Quebec, CAN	river, bay	
	A	F	-	SU			mm carapace	219	281	12	1956		

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
EGG WEIGHT													
Congdon et al. 1983	-	-	-	-	9.6		g			52	Michigan	NS	Wet mass. As cited in Congdon et al. 1986.
Congdon et al. 1986	-	-	-	-	9.6		g			16	S Carolina	bay, marsh	Wet mass.
Congdon & Gibbons 1985	-	-	-	-	237 9.6		g/clutch g/egg			4 73	N Carolina	NS	Mean clutch size= 23.6 (6.6 = 2 SE) eggs. Mean width of eggs = 25.8 (0.15 = 2 SE).
Ernst & Barbour 1972	-	-	-	-			g	7	15		NS	NS	Summarizing other work.
Ewert 1979	-	-	-	-	12.5		g					NS	
Hotaling et al. 1985	-	-	-	-	9.32		g	5.73	13.76	58	New Jersey 1980-83	Great Swamp National Wildlife Refuge	N= number of nests; min and max are means for nests. Weights at time of oviposition.
Petokas & Alexander 1980	-	-	-	-	11.1 308.0		g/egg g/clutch	142.0	468.0	380 12	n New York 1977	Cranberry Creek Marsh	
Punzo 1975 (osceola)	-	-	-	-			g	5	13		Florida 1970	stream, pond, swamp	
Yntema 1970, Vogt (unpubl.) (serpentina)	-	-	-	-			g	7	17.3		NS	NS	As cited in Ewert 1979.
HATCHING WEIGHT (AND LENGTH)													
Ewert 1979 (serpentina)	H	-	-	-	8.9		g			140	Minnesota	NS	Taken from seven clutches.
Hotaling et al. 1985	-	-	-	-	7.54		g	5.16	11.08	90	New Jersey 1980-83	Great Swamp National Wildlife Refuge	N= number of nests; min and max are means for nests.
Ernst & Barbour 1972	H	B	-	-	5.7 (26-31)		g body wt (mm carapace)				NS	NS	Weight of turtle and length of carapace at hatching.
GROWTH RATE													
Gibbons 1968	J	B	-	-	32		mm carapace/yr			6	Michigan 1965	polluted river	

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Graham & Perkins 1976	J	B	1	SU	26.5		mm carapace/yr			2-8	Massachusetts	polluted marsh	Growth rate expressed as mm increase of carapace length/year: (1) from hatching through 6th year; (2) 5th to 6th year.
Kiviat 1980	J	B	-	-	20.0		mm/yr	9	31	2	New York	fresh tidal wetland	
	J	B	-	-	20.1		mm/yr	17	25	20	1972-75		

METABOLIC RATE (OXYGEN)

Lynn & von Brand 1945	J	B	R	-	2.54		lO2/kg-day				NS	lab	Turtle weighing 7,180 g at a temperature of 25 C. As cited in Sievert et al. 1988.
--------------------------	---	---	---	---	------	--	------------	--	--	--	----	-----	--

FOOD INGESTION RATE

Kiviat 1980	B	-	-	SU			g/g-day	0.01	0.016	2	New York 1973	captivity	
-------------	---	---	---	----	--	--	---------	------	-------	---	---------------	-----------	--

***** DIET *****

Reference	Age	Sex	Food type	Spring	Summer	Fall	Winter	N	Location	Habitat - Measure	Notes
Alexander 1943	B	-	plants (algae) animals (crayfish) (fiddler crab) (sucker) (bullhead) (sunfish) (unknown fish) miscellaneous		36.5 (12.8) 54.1 (8.0) (2.7) (3.2) (6.3) (7.5) (12.4) 9.4			470	Connecticut 1939-41	lakes, ponds, streams, swamps - % wet volume; stomach contents	Totals of lakes, ponds, streams, and swamps. Volume was obtained by water displacement to the nearest cubic centimeter. Miscellaneous includes scavengings, paper, debris, and unclassified material. The ineffectiveness of bait left in the traps would lead one to believe that only a small amount of dead material is taken.
Barbour 1950	-	-	Cambarus remains		100			1	Kentucky 1948	Big Black Mountain - % volume	Measure of volume not specified.
Budhabatti & Moll 1988	B	B	animal plant		50 50			NS	Illinois	habitat NS - measure NS	
Bush 1959	-	-	Cambarus sp. Hyla v.versicolor		75 25				Kentucky 1955,56	NS - % volume; stomach contents	Dry or wet volume not specified.

Reference	Age	Sex	Food type	Spring	Summer	Fall	Winter	N	Location	Habitat - Measure	Notes
Carr 1952	-	-	vegetable matter		36.2				NS	NS	Measure of volume not specified. As cited in Bush 1959.
			fish		35.4					-	
			carrion		19.6					% volume	
Hammer 1969	B	B	Potamogeton		68.2			22	Nebraska 1965	lakes	Carp was used as bait in traps.
			algae		36.4					-	
			Polygonum sp.		27.3					% frequency of occurrence	
			Lemna sp.		18.2						
			other vegetation		40.9						
			carp		72.8						
			other fish		63.7						
			snail		95.4						
			insect		50.0						
			other Molluscs		18.2						
			birds		22.7						
			turtle		4.5						
Meyers-Schone & Walton 1990 (osceola)	A	B	fish		83.7			9	Tennessee	embayment	Summer = April 29-July 12.
			vegetation		13.6					-	
			clams		0.2					% wet volume;	
			mud and rocks		2.5					gastrointestinal tract contents	
Pell 1940	-	-	plant material		80.2				NS	NS	Measure of volume not specified. Animals include snails, clams, crayfish, insects, fish, and frogs. As cited in Bush 1959.
			animals		16.2					% volume	
Punzo 1975 (osceola)	A	B	Platyhelminthes		5.5			59	Florida 1970	NS	Summer = May to October.
			Annelida		6.4					-	
			Insecta		38.0					% occurrence;	
			other Arthropoda		15.0					gastrointestinal tract contents	
			Gastropoda		8.0						
			amphibians		10.0						
			reptiles		10.0						
			plant		> 6.0						
Smith 1956	B	B	plants		35-70				NS	habitat NS	-
			animals		6-35					% of diet;	
										measure NS	

*** POPULATION DYNAMICS ***

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes	
HOME RANGE SIZE														
Budhabhatti & Moll 1988	-	-	-	SU			ha	0.28	15.2		Illinois 1986	NS		
Ernst 1968	-	-	-	-	1.8		ha				Pennsylvania	marsh	As cited in DeGraaf and Rudis 1983.	
Ernst 1971	A	-	-	-	1.8		ha			9	Pennsylvania	pond	As cited in Bury 1979.	
Galbraith et al. 1987	A	M	-	SU	1.03		ha	0.445	1.76	4	Ontario, CAN	lake	Estimated using quadrat summation area (QSA) method.	
Galbraith et al. 1987	A	M	-	SU	0.7	0.29 SD	ha	0.24	1.3	4	Ontario, CAN	lake	Estimated using the modified minimum area (MMA) method.	
Kiviat 1980	J	B	-	-	3.3		ha			10	New York 1972-75	fresh tidal wetland		
	A	M	-	-	8.9		ha			32				
	A	F	NB	-	7.2		ha			6				
Lonke & Obbard 1977	A	F	-	-	4.5		km			1	Ontario, CAN 1972-74	Lake Sasajewun	Distance from Lake Sasajewun. Overall, 91.9% of 47 turtles were seen at the nesting site in a year subsequent to their tagging. Sand and gravel fill for a dam created a nesting site which mature females visited annually in June.	
Obbard & Brooks 1981	A	F	-	SU	3.79	1.46 SD	ha	2.5	5.19	4	Ontario, CAN	lake	Estimated using modified minimum area (MMA) method.	
	A	M	-	SU	3.21	2.67 SD	ha	0.95	8.38	6				
	A	B	-	SU	3.44	2.18 SD	ha			10				
POPULATION DENSITY														
Congdon et al. 1986	B	B	-	-	8		N/ha				S Carolina	bay, marsh		
Congdon et al. 1986	B	B	-	-	7.3		N/ha				S Carolina	pond		
Congdon et al. 1986	B	B	-	-	12.8		N/ha				Michigan	marsh		
Congdon et al. 1986	B	B	-	-	13.3		N/ha				Michigan	bay, marsh, pond		

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Congdon et al. 1986	B	B	-	-	6.8		N/ha				Michigan	pond	
Froese & Burghardt 1975	A	B	-	SU	59		N/ha			48	Tennessee	pond	
Galbraith et al. 1987	A	M	-	SU	1.46		N/ha			4	Ontario, CAN	oligotrophic lake	
Galbraith et al. 1988 (serpentina)	A	B	-	SU	1.67		N/ha	1.19	2.41		Ontario, CAN 1984-85	large oligotrophic lake	Density is based on modified Peterson estimate.
	B	B	-	SU	2.03		N/ha	1.35	3.39				
Galbraith et al. 1988 (serpentina)	A	B	-	SU	2.45		N/ha	.88	4.91		Ontario, CAN 1984-85	small oligotrophic lake	Density is based on modified Peterson estimate.
	B	B	-	SU	2.73		N/ha	0.97	5.45				
Galbraith et al. 1988 (serpentina)	A	B	-	SU	57.8		N/ha	38.5	90.8		Ontario, CAN 1984-85	eutrophic pond	Density is based on modified Peterson estimate.
	B	B	-	SU	60.4		N/ha	40.3	95.0				
Galbraith et al. 1988 (serpentina)	B	B	-	SU	2.31	1.45 SD	N/ha	1.0	4.9	6	Ontario, CAN 1984-85	oligotrophic lakes and ponds	Summary of six field studies, including the author's.
Galbraith et al. 1988 (serpentina)	B	B	-	SU	29.3	27.6 SD	N/ha	4.4	65.9	11	Ontario, CAN	eutrophic ponds	Summary of data from various authors for 11 eutrophic ponds.
Hammer 1969 (serpentina)	A	F	-	SU	1.2		N/ha				S Dakota	marsh	Estimate of population obtained by doubling the number of females (which were censused) to include males.
Kiviat 1980	-	-	1	-	4		N/ha			600	New York 1972-75	fresh tidal wetland	Measure of (1) Crude density; (2) ecological density. Ecological density uses land area of pools and creeks only, which is less than or equal to 25% of the bay, as these are areas actually used by turtles.
	-	-	2	-	16		N/ha						
Lagler 1943	-	-	-	-	5		N/ha				Illinois	lake	As cited in Bury 1979.
Major 1975	-	B	-	SU	62.5		N/ha				w West Virginia 1972	ponds	Two 0.40 ha ponds with 1.37 m maximum depth. Trapping from May 1972 - October 1972.

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Obbard 1983	A	-	-	SU	1.65		N/ha			6	Ontario, CAN	lake	As cited in Galbraith et al. 1987.
Pearse 1923	-	-	-	-	1.7		N/ha				Wisconsin	lake	As cited in Bury 1979.
CLUTCH SIZE													
Congdon et al. 1987	-	-	-	-	27.9	0.76 SE	eggs	12	41	68	se Michigan	aquatic	
Congdon et al. 1986	A	F	-	-	28.0		eggs			52	Michigan	pond, swamp, marsh	
Congdon and Gibbons 1985	-	-	-	-	23.6	3.3 SE	eggs			4	N Carolina	NS	
Ernst & Barbour 1972	-	-	-	-			eggs	11	83		NS	NS	Summarizing other work. Author states that the number of eggs in a clutch is usually 20-30.
Hammer 1969	-	-	-	-	49.0		eggs	31	87	102	S Dakota 1964-67	marsh	
Iverson 1977	-	-	-	-	16.6	1.6 SD	eggs	14	20	8	Florida	NS	As cited in Petokas & Alexander 1980.
Kiviat 1980	A	F	BR	SU	29.6	1.8 SE	eggs	16	54	27	New York 1974	fresh tidal wetland	
Lonke & Obbard 1977	-	-	-	-	33.9	10.03 SE	eggs	18	66	46	Ontario, CAN 1972-74	Lake Sasajewun	
Macnamara 1919	-	-	-	-			eggs	39	51	5	Ontario, CAN	NS	Author states that clutches containing 24 eggs or fewer had never been observed. As cited in Petokas & Alexander 1980.
Petokas & Alexander 1980	-	-	-	-	30.9	10.87 SD	eggs	16.0	59.0	16.0	n New York 1977	riverine marsh shore	Clutch sizes of 20 to 40 eggs most common (75% of all complete nests), with 36 eggs being the most frequently encountered (3 nests). Predators destroyed 94% of all nests under study.
Punzo 1975	A	F	L	SU			eggs	6	21		Florida 1970	stream, pond, swamp	
White & Murphy 1973	-	-	-	-	19.9		eggs	12.0	42.0	20.0	Tennessee	NS	As cited in Petokas & Alexander 1980.

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
CLUTCHES/YEAR													
Cahn 1937	-	-	-	-	2		/year				southern range	NS	As cited in DeGraaf and Rudis 1983.
Ernst & Barbour 1972	-	-	-	-	>1		/year				NS	NS	Summarizing other work.
Ewert (unpubl.)	A	F	BR	-			/year		3		Florida	NS	As cited in Moll 1979.
Minton 1972	-	-	-	-			/year	1	2		Indiana	NS	As cited in Graves and Anderson 1987.
White and Murphy 1973	A	F	BR	-			/year		1		Tennessee	NS	As cited in Moll 1979.
DAYS INCUBATION													
Breckenridge 1944	-	-	-	-			days	83	105		c Minnesota	natural	Days to pipping (101 days to emergence). As cited in Ewert 1979.
DeGraaf & Rudis 1983	-	-	-	-	80-91		days				NS	NS	Summarizing other studies.
Ewert 1979	-	-	1	-	82		days			24	Missouri	Lab	Temperature (1)25-25.5 C; (2)29.5-30 C.
	-	-	2	-	66.7		days			20			
Ewert 1979	-	-	1	-	90.8		days			5	Arkansas	artificial	Temperature (1)25-25.5 C; (2)29.5-30 C.
	-	-	2	-	73.0		days			5			
Ewert 1979	-	-	1	-	97.5		days			22	Florida	artificial	Temperature (1)25-25.5 C; (2)26-30 C; (3)29.5-30 C.
	-	-	2	-	80.0		days			13			
	-	-	3	-	77.6		days			18			
Ewert 1979	-	-	-	SU			days	67	73		se Wisconsin	natural	Days to pipping.
Hammer 1971	-	-	-	-			days	70	120				As cited in Graves and Anderson 1987.
Hammer 1969	-	-	-	-			days	91	125		NS	NS	Duration of incubation depends on environmental conditions.
Lynn and Von Brand 1945	-	-	1	-	72-75.1		days			34	Wisconsin	artificial	Temperature (1) 25-25.5 C; (2) 29.5-30 C. As cited in Ewert 1979.
	-	-	2	-	60.0		days			34			
Obbard & Brooks 1981	-	-	-	-	105		days	90	119	3	Ontario, CAN	lake	

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Punzo 1975 (osceola)	-	-	-	-			days	48	118		Florida 1970	stream, pond, swamp	
Yntema 1968	-	-	1	-	140		days				New York	artificial	Temperature (1) 20 C; (2)29.5-30 C. As cited in Ewert 1979.
	-	-	2	-	63.3		days						
AGE AT SEXUAL MATURITY													
Christiansen & Burken 1979	-	F	-	-	6-7		years			38	Iowa 1969-77	NS	Ovulations first occurred during the 6th & 7th year of growth.
	-	M	-	-	4-5		years			25			
Christiansen & Burken 1979	-	F	-	-	9-10		years				Iowa 1969-77	NS	Age at first nesting.
Galbraith et al. 1989	-	F	-	-	17-19		years	14-15		174	Ontario, CAN	river, mixed forest	Mean age at first nesting; minimum age determined as lower 96% confidence limit on age predicted from size.
Hammer 1969	-	F	-	-	9		years				S Dakota	NS	Age at first nesting.
Pell 1941	-	F	-	-	6-8		years				New York	NS	Age at first nesting. As cited in Galbraith et al. 1989.
LENGTH AT SEXUAL MATURITY													
Ernst & Barbour 1972	-	B	-	-	200		mm carapace				NS	NS	Summarizing other information.
Mosimann & Bider 1960	-	B	-	-	200		mm carapace				Quebec, CAN	NS	
White & Murphy 1973	-	B	-	-	145		mm plastron				Tennessee	NS	As cited in Bury 1979.
MORTALITY													
Galbraith & Brooks 1987	A	B	-	-			%/yr	3	7		NS	NS	As cited in Frazer et al. 1991.
LONGEVITY													
Gibbons 1987	-	-	-	-			years		24	2	Michigan	Sherriff's Marsh	Two turtles known to be between 15-24 years old from mark and recapture.

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Gibbons 1987	-	-	-	-			years		19	7	S Carolina	Savannah River Plant	Seven turtles known to be between 10-19 years of age from mark and recapture.

*** SEASONAL ACTIVITIES ***

Reference	Begin	Peak	End	Location	Habitat	Notes
MATING						
Ernst & Barbour 1972	Apr	Jun	Nov	NS	NS	Mating season depends on latitude. (May be discussing the observations of Smith 1956).
Kiviat 1980	earl Jun	mid Jun	end Jun	New York 1974	fresh tidal wetland	Hammer 1969 reported nesting stimulated by rain.
Punzo 1975	mid June			Florida 1970	stream, pond, swamp	Nesting behavior between 6 am to 8 am; Temperature from 60-70 F enhances nesting.
NESTING						
Congdon et al. 1987	late May		mid Jun	se Michigan	aquatic	
Ernst & Barbour 1972	May	Jun	Sep	NS	NS	Nesting season depends on latitude. (May be discussing the observations of Smith 1956).
Hammer 1969	earl Jun	mid Jun	end Jun	S Dakota 1964-67	marsh	
Lonke & Obbard 1977		Jun 19-20		Ontario, CAN 1972,73	Lake Sasajewun	
Lonke & Obbard 1977		Jun 26-28		Ontario, CAN 1974	Lake Sasajewun	
Lonke & Obbard 1977		Jun 13-14		Ontario, CAN 1975	Lake Sasajewun	
Obbard & Brooks 1981	earl Jun	mid Jun	late Jun	Ontario, CAN	lake	

Reference	Begin	Peak	End	Location	Habitat	Notes
Petokas & Alexander 1980	late May	earl-mid Jun	late Jun	n New York 1977	Cranberry Creek Marsh	Two separate nesting periods observed: (1) May 28-June 6 (N=17); (2) June 10-21 (N=35). Peaks: (1) June 1 (N=9); (2) June 12 (N=10).
Wilhoft et al. 1979	May 21		Jun 6	New Jersey	swamp	Nesting season; from daily field observations.
HATCHING						
Congdon et al. 1987	late Aug	Sep	earl Oct	se Michigan	aquatic	
Ernst & Barbour 1972	Aug		Oct	NS	NS	Depends on latitude. (May be discussing the observations of Smith 1956).
Obbard & Brooks 1981	Sep		earl Oct	Ontario, CAN	lake	
HIBERNATION						
Christiansen & Burken 1979	late Sep		mid Mar	Iowa 1969-77	NS	Based on earliest and latest observed turtle activity.
Ernst & Barbour 1972	Oct		Mar-May	NS	NS	Depends on latitude. (May be discussing the observations of Smith 1956).
Obbard & Brooks 1981	mid Oct		earl May	Ontario, CAN	lake	

***** PAINTED TURTLE *****

*** NORMALIZING AND CONTACT RATE FACTORS ***

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
BODY WEIGHT (AND LENGTH)													
Congdon et al. 1986	A	M	-	-	176.9	1.92	SE g			770	Michigan	bay, ponds, marsh	
	A	F	-	-	326.7	4.95	SE g			249			
	J	B	-	-	64.2	1.59	SE g			375			
Congdon & Gibbons 1985 (dorsalis)	A	F	BR	-	361.0		g			1	Georgia	NS	
	A	F	BR	-	(136.0)		(mm plastron)			1			
Ernst 1971b (picta x marginata)	A	F	-	-	266.5	60.1	SD g	83.5	450.3	142	Pennsylvania	NS	Related lengths not provided.
	A	M	-	-	189.1	52.3	SD g	102.0	274.5	163	1965-67		
Morlock et al. 1972 (picta)	A	B	-	-	317.6		g			13	New York	lab	Carapace length is approximate.
	A	B	-	-	(130)		(mm carapace)			13	1969-70		
Tinkle et al. 1981 (marginata)	A	F	BR	SU	395.4		g			82	Michigan	pond	
	A	F	BR	SU	(130.7)		(mm plastron)			82	1977-79		
	A	F	BR	SU	(139.9)		(mm carapace)			82			
Wade & Gifford (1965; unpubl.)	-	-	-	-	230		g				Indiana	lake	As cited in Iverson 1982.
BODY LENGTH													
Congdon et al. 1986	A	M	-	-	99.9	0.48	SE mm plastron			770	Michigan	bay, ponds, marsh	
	A	F	-	-	125.1	0.64	SE mm plastron			249			
	J	B	-	-	65.0	0.65	SE mm plastron			375			
Congdon et al. 1986	A	M	-	-	109.7	0.54	SE mm carapace			770	Michigan	bay, ponds, marsh	
	A	F	-	-	134.2	0.81	SE mm carapace			249			
	J	B	-	-	71.5	0.69	SE mm carapace			375			
Ernst 1971b (picta x marginata)	H	B	1	-	24		mm plastron	17	30		se	NS	Ages: (1) hatchling (H); (2) one year old (Y); (3) two years; (4) three years; (5) four years.
	Y	B	2	-	42		mm plastron	33	52		Pennsylvania		
	J	B	3	-	53		mm plastron	38	68				
	J	B	4	-	66		mm plastron	47	78				
	J	B	5	-	72		mm plastron	62	89				
Ernst 1971c	A	F	-	-			mm plastron		145		Pennsylvania	marsh	
	A	M	-	-			mm plastron		121		1965-67		

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Gibbons 1968b	A	M	1	-	80-84		mm plastron				Michigan	marsh	Age in years as of 1965: (1) 6.0-10.0; (2) 10.5-14.5; (3) 15.0-19.0; (4) 19.5-23.5; (5) 24.0-28.0; (6) 28.5-32.5; (7) 33.0-37.0; (8) 12.0-16.0; (9) 16.5-20.5; (10) 21.0-25.0; (11) 25.5-29.5; (12) 30.0-34.0; (13) 34.5-39.5. Estimates of mature turtle ages were based on a growth rate of 1.1 mm/yr for both sexes and on the number of turtles estimated to be in each size class.
	A	M	2	-	85-89		mm plastron				1964-66		
	A	M	3	-	90-94		mm plastron						
	A	M	4	-	95-99		mm plastron						
	A	M	5	-	100-104		mm plastron						
	A	M	6	-	105-109		mm plastron						
	A	M	7	-	110-116		mm plastron						
	A	F	8	-	110-114		mm plastron						
	A	F	9	-	115-119		mm plastron						
	A	F	10	-	120-124		mm plastron						
	A	F	11	-	125-129		mm plastron						
	A	F	12	-	130-134		mm plastron						
	A	F	13	-	135-140		mm plastron						
Legler 1954	A	M	-	-	85		mm plastron				s Minnesota	NS	As cited in Bury 1979. Approximate average value is at least the value listed.
	A	F	-	-	125		mm plastron						
Mitchell 1985 (picta)	N	B	-	-	22.1	0.3 SD	mm carapace	21.8	22.4	4	c Virginia	Grassy Swamp Lake	
	N	B	-	-	20.7	0.7 SD	mm plastron	20.3	21.8	4	1980-81		
Mitchell 1985 (picta)	-	F	-	-	132.7	7.8 SD	mm carapace	112.5	148.2	65	c Virginia	Grassy Swamp Lake	
	-	F	-	-	124.1	8.1 SD	mm plastron	105.6	144.6	65	1980-81		
Moll 1973 (bellii)	A	F	-	-	157	2.6 SE	mm plastron	136	185	23	Wisconsin	NS	
	A	M	-	-	132	2.9 SE	mm plastron	96	155	32	1969-72		
Moll 1973 (bellii x marginata)	A	F	-	-	151	1.5 SE	mm plastron	130	165	45	Illinois	NS	
	A	M	-	-	116	1.9 SE	mm plastron	81	147	55	1969-72		
Moll 1973 (dorsalis x marginata)	A	F	-	-	125	2.5 SE	mm plastron	108	151	19	Tennessee	NS	
	A	M	-	-	99	1.8 SE	mm plastron	65	123	17	1969-72		
Moll 1973 (dorsalis)	A	M	-	-	73	1.4 SE	mm plastron	60	84	21	Louisiana 1969-72	NS	
Moll 1973 (dorsalis)	A	F	-	-	114	1.1 SE	mm plastron	100	131	37	Arkansas 1969-72	NS	
EGG WEIGHT													
Cagle 1954 (marginata, dorsalis)	-	-	-	-	6.15		g	5.5	7.6	95	Illinois	NS	
Cagle 1954 (marginata, dorsalis)	-	-	-	-	5.0		g	4.9	9.3	71	Tennessee	NS	

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Congdon and Tinkle 1982	-	-	-	-	4.14	0.22	SE g				Michigan	aquatic	Wet mass.
Congdon & Gibbons 1985 (dorsalis)	-	-	-	-	6.17 30.9		g/egg g/clutch			5 1	Georgia	NS	
Ernst & Barbour 1972 (picta)	-	-	-	-	7.2		g	6.1	9.1		Pennsylvania	NS	
Ernst 1971b (picta x marginata)	-	-	-	-			g	3.2	9.1		NS	NS	
Ewert 1979	-	-	-	-	6.3		g				NS	NS	
Ratterman & Ackerman 1989	-	-	1	-	6.65	0.67	SD g			207	Iowa 1985-86	NS	(1) Initial mass, (2) final mass (gain water during incubation from soil).
	-	-	2	-	8.62	1.06	SD g			162			
Schwarzkopf & Brooks 1986	-	-	-	-	6.56		g	6.08	7.00	74	Ontario, CAN 1983-85	pond	Adult females laying clutches in successive years.
HATCHING WEIGHT													
Ewert 1979 (dorsalis)	H	B	-	-	4.6		g			30	Tennessee	NS	From nine clutches.
Ewert 1979 (bellii)	H	B	-	-	4.4		g			27	North Dakota	NS	From three clutches.
Mitchell 1985 (picta)	H	B	-	-	3.7	0.2	SD g	3.5	3.9	4	c Virginia 1980-81	Grassy Swamp Lake	
Ratterman & Ackerman 1989	H	B	1	SU	4.09	0.61	SD g			175	Iowa 1985-86	NS	Weight at hatching: (1) wet (2) dry.
	H	B	2	SU	0.84	0.13	SD g			165			
GROWTH RATE													
Christens & Bider 1986 (marginata)	J	F	1	-	35		mm/yr			5	Quebec, CAN	pond	Estimated growth rate from histogram in figure. Age in years provided in condition column.
	J	F	2	-	20		mm/yr			11	1983-85		
	J	F	3	-	19		mm/yr			10			
	J	F	4	-	12		mm/yr			9			
	J	F	5	-	12		mm/yr			8			
	J	F	6	-	10		mm/yr			10			
	J	F	7	-	8		mm/yr			13			
(continued)	A	F	8	-	5		mm/yr			12			

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Christens & Bider (continued)	A	F	9	-	4		mm/yr			8			1986
	A	F	10	-	3		mm/yr			9			
	A	F	11	-	3		mm/yr			2			
	A	F	12	-	6		mm/yr			4			
	A	F	16	-	3		mm/yr			2			
	A	F	20	-	1		mm/yr			4			
	A	F	24	-	1		mm/yr			2			
	A	F	26	-	2		mm/yr			1			
Ernst 1971b (picta x marginata)	A	M	-	-	1.31		mm/yr	0.2	4.4	57	Pennsylvania	NS	Plastron length (mm): (1) males 70-119, (2) females 80-139.
	A	F	-	-	1.76		mm/yr	0.1	7.1	51	1965-67		
Gibbons 1968b	-	-	1	-	13.0		mm/yr				Michigan	marsh	Age in years: (1)1-2; (2)5-6; (3)1-10. Increase in mean size in successive years.
	-	-	2	-	4.3		mm/yr				1964-66		
	-	-	3	-	7.7		mm/yr						
Wilbur 1975b	A	B	-	-	0.55		mm/yr				MI 1953-57, 1968-73	pond	Age = 10+ yrs.
METABOLIC RATE (OXYGEN)													
Lynn & von Brand 1945 (picta)	J	B	R	-	4.46		lO2/kg-day				NS	lab	Temperature = 25 C; body weight = 4.25 g; as cited in Sievert et al. 1988.
Sievert et al. 1988 (marginata)	J	-	1	-	5.06	0.42 SE	lO2/kg-day			16	NS	lab	Temperature = 25 C; average weight = 7.7 g. Condition: (1) day of feeding; (2) 1-day fast; (3) 10-day fast; (4) 19-day fast.
	J	-	2	-	3.44	0.29 SE	lO2/kg-day			16			
	J	-	3	-	1.98	0.13 SE	lO2/kg-day			16			
	J	-	4	-	1.57	0.19 SE	lO2/kg-day						
Stockard & Gatten 1983	A	B	1	-	0.725	0.442 SD	lO2/kg-day			41	N Carolina	lab	Temperature = 25 C. Average mass of test animals: (1) on land, resting, 215 g (79 to 395 g); (2) in water, resting, 215 g; (3) in water, swimming, 143 g (79 to 297 g).
	A	B	2	-	0.218	0.324 SD	lO2/kg-day			41	1979		
	A	B	3	-	0.386	0.679 SD	lO2/kg-day			26			
										26			
METABOLIC RATE (KCAL BASIS)													
Congdon et al. 1982 (marginata) (continued)	J	F	1	-	63		cal/day				Michigan	NS	Based on annual energy budget and assuming one set of eggs per female per year after age 7. Annual growth energy averages 4.9% over the first seven years and then declines to 0.3% by the 14th year. Energy devoted to eggs is approximately
	J	F	2	-	134		cal/day						
	J	F	3	-	295		cal/day						
	J	F	4	-	411		cal/day						
	J	F	5	-	534		cal/day						
	J	F	6	-	674		cal/day						
	J	F	7	-	769		cal/day						

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Congdon et al. 1982 (continued)	A	F	8	-	1,041		cal/day						14% of total energy budget for ages 7 to 14. In reality, each year approximately 30 to 50% of the Michigan population of adult females do not lay eggs. Age in years listed under condition column.
	A	F	9	-	1,115		cal/day						
	A	F	10	-	1,192		cal/day						
	A	F	11	-	1,230		cal/day						
	A	F	12	-	1,250		cal/day						
	A	F	13	-	1,282		cal/day						
	A	F	14	-	1,307		cal/day						

WATER INGESTION RATE

Ernst 1972	A	B	NB	SU	0.02		g/g-day	0.016	0.022	6	Pennsylvania	lab	Measured as evaporative water loss.
Trobec & Stanley 1971 (bellii)	A	B	-	-	-		g/g-day		0.025	11	Wisconsin	lab	Uptake of water by turtles held in artificial tap water at 23 +/- 2 °C.

INHALATION VOLUME

Milsom & Chan 1986	A	B	R	-	0.00246	0.00052 SE	m ³ /kg-day				NS	lab	
--------------------	---	---	---	---	---------	------------	------------------------	--	--	--	----	-----	--

*** DIET ***

Reference	Age	Sex	Food type	Spring	Summer	Fall	Winter	N	Location	Habitat - Measure	Notes
Ernst & Barbour 1972 (picta)	A	B	snails		12.1			56	Pennsylvania	habitat NS - % wet volume; stomach contents	Season not specified.
			amphipods		3.0						
			crayfish		7.5						
			insects		11.5						
			fish		13.0						
			other animals		14.1						
			algae		14.7						
			vascular plants		24.1						
		other plants		0.8							
Gibbons 1967	-	-	plants		>95			5	Michigan 1964-66	marsh - wet weight; % stomach contents	

Reference	Age	Sex	Food type	Spring	Summer	Fall	Winter	N	Location	Habitat - Measure	Notes
Knight & Gibbons 1968	-	-	(Month)	June	August			47	Michigan 1964-66	polluted river - average % wet volume when present; % stomach contents	See companion record for percent of stomachs containing item.
			plants	31.6	38.7						
			filamentous algae	41.0	44.2						
			higher aquatics	2.5	12.5						
			animals	77.3	72.3						
			Oligochaeta	-	30.0						
			Cladocera	1.5	48.5						
			Ephemeroptera nymf	-	1.0						
			Odonata nymphs	60.0	38.3						
			Hemiptera nymphs	3.0	5.0						
			Lepidoptera larvae	1.0	50.0						
			Coleoptera larvae	3.0	-						
			Culicidae larvae	-	11.0						
			Tendipedidae larva	30.8	7.7						
			Tendipedidae pupae	36.7	10.0						
			Stratiomyidae larv	-	1.0						
unidentified anima	96.0	10.0									
gastropods	18.7	17.8									
detritus	7.8	1.9									
Knight & Gibbons 1968	-	-	(Month)	June	August			47	Michigan 1964-66	polluted river - average % of stomachs containing item	See companion record for percent of bulk when present.
			plants	64.0	66.7						
			filamentous algae	48.0	47.6						
			higher aquatics	16.0	38.1						
			animals	100	100						
			Oligochaeta	-	4.8						
			Cladocera	16.0	85.7						
			Ephemeroptera nymf	-	14.3						
			Odonata nymphs	4.0	14.3						
			Hemiptera nymphs	16.0	14.3						
			Lepidoptera larvae	4.0	4.8						
			Coleoptera larvae	8.0	-						
			Culicidae larvae	-	9.5						
			Tendipedidae larva	96.0	61.9						
			Tendipedida pupae	84.0	47.6						
			Stratiomyidae larv	-	4.8						
unidentified anima	4.0	14.3									
gastropods	52.0	47.6									
detritus	92.0	71.4									
Marchand 1942 (dorsalis)	J	B	animal	85				NS	habitat NS - stomach contents; measure unspecified	As cited in Mahmoud & Klicka 1979.	
			plant	15							
Marchand 1942 (dorsalis)	A	B	plant material	12				NS	habitat NS - stomach contents; measure unspecified	As cited in Mahmoud & Klicka 1979.	
			insects & amphipods	88							

Reference	Age	Sex	Food type	Spring	Summer	Fall	Winter	N	Location	Habitat - Measure	Notes
Lagler 1943 (marginata)	-	-	insects aquatic plants		20 60				Michigan	habitat NS - measure NS	As cited in DeGraaf and Rudis 1983.
Cahn 1937 (marginata)	-	-	plants		100			25	NS	habitat NS - % volume	As cited in Smith 1961.

*** POPULATION DYNAMICS ***

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
HOME RANGE SIZE													
McAuliffe 1978 (bellii)	-	F	-	SP	174		m			25	e Nebraska	oxbow lake complex	Measured mean straight-line distance between recaptures. Movements between overwintering areas and other locations in Beaver Slough.
	-	M	-	SP	121		m			10	1974-75		
Sexton 1959 (marginata)	A	B	1	SP	63-144		m movement			301	Michigan	NS	Seasonal movements from: (1) hibernation ponds to other ponds w/floating vegetation; (2) spring ponds back to hibernation ponds; (3) hibernation ponds to deepwater areas.
	A	B	2	SU	86-91		m movement			300	1953-57		
	A	B	3	FA	88-130		m movement			336			

POPULATION DENSITY

Bayless 1975	-	-	-	-	24.7		N/ha	22.2	27.2	3	New York 1970-72	pond	
Congdon et al. 1986	B	B	-	-	41.6		N/ha				Michigan	ponds	
Congdon et al. 1986	B	B	-	-	39.9		N/ha				Michigan	pond, marsh, swamp	
Congdon et al. 1986	B	B	-	-	89.5		N/ha				Michigan	marsh	
Ernst 1971c	B	B	-	-	590		N/ha	240	941		Pennsylvania 1965-67	pond, marsh	Range = 95% confidence limit (i.e., mean +/- 2 SEs).
Frazer et al. 1991	B	B	-	-	827.7		N/ha				Michigan 1980-89	lake, marsh	

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Gibbons 1968b	-	-	-	-	576		N/ha				Michigan 1964-66	marsh	
MacCulloch & Secoy 1983 (bellii)	B	B	-	SU	11.1		N/ha			167	Saskatchewan, CAN 1978-81	river	
Pearse 1923	-	-	-	-			N/ha	12	49		Wisconsin	lake	As cited in Bury 1979.
Sexton 1959 (marginata)	B	B	-	-			N/ha	98	410		Michigan 1953-57	ponds, marsh	
CLUTCH SIZE													
Blanchard 1923 (bellii)	-	-	-	-	8.8		eggs	5	13		Iowa	NS	As cited in Christiansen & Moll 1973.
Cagle 1954 (marginata, dorsalis)	-	-	-	-	6.3		eggs	3	8	48	Illinois	NS	
Cagle 1954 (marginata, dorsalis)	-	-	-	-	4.7		eggs	2	7		n Michigan	NS	
Cahn 1937 (marginata)	-	-	-	-	6.5		eggs	4	10		NS	NS	As cited in Smith 1961.
Christiansen & Moll 1973 (bellii)	-	-	1	-	8.8		eggs	2	15	46	New Mexico 1964-70	pond (captive)	Estimated by: (1) enlarged follicles; (2) eggs; (3) corpora lutea.
	-	-	2	-	9.0		eggs	5	15	46			
	-	-	3	-	8.9		eggs	5	15	46			
Christiansen & Moll 1973 (bellii)	-	-	1	-	9.6		eggs	1	22	28	Wisconsin 1969-70	varied	Estimated by: (1) enlarged follicles, (2) eggs, (3) corpora lutea.
	-	-	2	-	10.2		eggs	7	15	28			
	-	-	3	-	9.8		eggs	7	15	28			
Christens & Bider 1986 (bellii)	-	-	-	-	9.2	0.20 SD	eggs	5	12		Quebec, CAN 1983-85	freshwater	No significant relationship between clutch & body size, or egg size & age.
Congdon & Tinkle 1982 (marginata)	-	-	-	-	7.6		eggs	2	11		Michigan 1978-81	NS	
Congdon & Gibbons 1985 (dorsalis)	-	-	-	-	5.0		eggs			1	Georgia	NS	

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
DeGraaf & Rudis 1983 (marginata)	-	-	-	-	6.5		eggs	3	10		NS	NS	
Ernst & Barbour 1972 (bellii)	-	-	-	-			eggs	4	20		NS	NS	
Ernst & Barbour 1972 (picta)	-	-	-	-			eggs	2	11		NS	NS	
Ernst & Barbour 1972 (marginata)	-	-	-	-			eggs	3	10		NS	NS	
Ernst & Barbour 1972 (dorsalis)	-	-	-	-			eggs	2	7		NS	NS	
Ernst & Barbour 1972 (marginata)	-	-	-	-	4.73		eggs	4	6		Pennsylvania	NS	
Ernst 1971c	-	-	-	-	4.73		eggs	4	6		Pennsylvania 1965-67	NS	With the infertility and prehatching mortality rates measured in the lab, only 2.5 eggs on average are likely to hatch young.
Gibbons 1968a	-	-	1	-	6.6		eggs	5	8		Michigan	marsh, lake	Year: (1) 1965; (2) 1966. Only two of 41 individuals had less than five eggs and only two had more than eight.
	-	-	2	-	6.1		eggs	5	8		1964-66		
MacCulloch & Secoy 1983 (bellii)	-	-	-	-	19.8		eggs	17	23	5	Saskatchewan, CAN 1981	creek bank	
Mitchell 1985 (picta)	-	-	-	-	4.16	1.13 SD	eggs	1	7	38	c Virginia 1980-81	Grassy Swamp Lake	
Moll 1973 (bellii)	-	-	-	-	10.7		eggs	4	16	12	Wisconsin 1969-72	NS	Based on counts of enlarged follicles, corpora lutea, and oviducal eggs.
Moll 1973 (bellii x marginata)	-	-	-	-	8.7		eggs	6	14	24	Illinois 1969-72	NS	Based on counts of enlarged follicles, corpora lutea, and oviducal eggs.

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Moll 1973 (dorsalis x marginata)	-	-	-	-	4.8		eggs	2	9	15	Tennessee 1969-72	NS	Based on counts of enlarged follicles, corpora lutea, and oviducal eggs.
Moll 1973 (dorsalis)	-	-	-	-	4.1		eggs	1	6	20	Louisiana, Arkansas 1969-72	NS	Based on counts of enlarged follicles, corpora lutea, and oviducal eggs.
Powell 1967 (picta)	-	-	-	-	-		eggs	5	11		NS	NS	As cited in Christens & Bider 1986.
Ratterman & Ackerman 1989	-	-	-	-	11.8	2.4 SD	eggs			29	Iowa 1985-86	NS	
Schwarzkopf & Brooks 1986	-	-	-	-	7.3		eggs			74	Ontario, CAN 1983-85	pond	Females that layed clutches in successive years.
Tinkle et al. 1981 (marginata)	-	-	-	-	7.55	0.35 SE	eggs	6.86	7.86	82	Michigan 1977-79	pond	Eggs per cm of plastron length = 0.578 (SE 0.013).
CLUTCHES/YEAR													
Christiansen & Moll 1973 (bellii)	-	-	-	-	14.8		eggs/yr				New Mexico 1964-70	varied	Average annual female reproductive capacity; animals yearly laid between 1 & 3 clutches.
Christiansen & Moll 1973 (bellii)	-	-	-	-	2		clutches/yr				New Mexico 1964-70	varied	67% of females (estimated).
Christiansen & Moll 1973 (bellii)	-	-	-	-			clutches/yr	1	3		Wisconsin 1969-70	NS	
Ernst 1971b (picta x marginata)	-	-	-	-	1		clutches/yr				Pennsylvania 1966-67	NS	
Gibbons 1968a	-	-	-	-	2.0		clutches/yr				Michigan 1964-66	lake, marsh	
Legler 1954; Gemmell 1970	-	-	-	-	1		clutches/yr				NS	NS	As cited in Christens and Bider 1986.
Moll 1973 (dorsalis)	-	-	-	-			clutches/yr		4		Louisiana	NS	The maximum is 4 or 5.
Moll 1973 (bellii)	-	-	-	-	>1		clutches/yr		2		Wisconsin 1969-72	NS	61.5% of females produced two clutches (total of 17.28 eggs per female per year).

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Moll 1973 (bellii x marginata)	-	-	-	-	>2		clutches/yr			3	Illinois 1969-72	NS	96.0% of females produced two clutches and 37.5% of females produced three clutches (total of 20.31 eggs per female per year).
Moll 1973 (dorsalis x marginata)	-	-	-	-	>3		clutches/yr			5	Tennessee 1969-72	NS	93.0% of females produced two clutches, 60% produced three clutches, 47% produced four clutches, and 7% produced five clutches (total of 14.74 eggs per female per year).
Moll 1973 (dorsalis)	-	-	-	-	> 3		clutches/yr			5	Louisiana 1969-72	NS	100 % of females produced two clutches, 80 % produced three clutches, 30 % produced four clutches, and 5 % produced five clutches (total of 12.92 eggs per female per year).
Schwarzkopf & Brooks 1986	-	-	1	-	1		clutches/yr			73%	Ontario, CAN	NS	(1) Nesting both years; (2) nesting either year.
	-	-	1	-	2		clutches/yr			27%	1983,85		
	-	-	2	-	2		clutches/yr			12.5%			
Snow 1980 (bellii x marginata)	-	-	-	-	1-2		clutches/yr	0	2		Michigan	kettle ponds	A minimum of 33% of females laide second clutches. The total number of eggs produced in two clutches by three females was 16, 14, and 12.
Tinkle et al. 1981 (marginata)	-	-	-	-	0.60		clutches/yr	0.43	0.71	216	Michigan 1977-79	NS	3.9% (5/129) of females produced two clutches in one year.
Wilbur 1975a (marginata)	-	-	-	-	2		clutches/yr				MI 1953-57, 1968-73	pond	No evidence presented.
DAYS INCUBATION													
Breckenridge 1944	-	-	-	-	79		days	75	81		c Minnesota	natural	As cited in Ewert 1979. Days to pipping.
Ernst & Barbour 1972 (picta)	-	-	-	-	76		days	72	80		Pennsylvania	NS	
Ernst 1971c	-	-	-	-	65-80		days				se Pennsylvania	NS	

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Ewert 1979	-	-	1	-	77.4		days			20	Tennessee	lab	Temperature: (1) 25-25.5 C; (2) 27.4 C; (3) 29.5-30 C. Eggs from local Tennessee populations. Incubation defined as days from laying to pipping.
	-	-	2	-	62.0		days			5			
	-	-	3	-	56.3		days			17			
Ewert 1979	-	-	1	-	72.0		days			3	Connecticut	lab	Temperature: (1) 25-25.5 C; (2) 30-32 C. Eggs from local Connecticut populations. Incubation defined as period from laying to pipping.
	-	-	2	-	48.7		days			20			
Ewert 1979	-	-	-	-			days	60	65		se Wisconsin	NS (natural)	Days to pipping.
Ewert 1979	-	-	-	-			days	72	99		nw Minnesota	NS (natural)	Days to pipping.
Ewert 1979	-	-	-	-	66.2		days			20	n Michigan	lab	Eggs from northern Michigan. Incubation period defined as days from laying to pipping. Sample size is in eggs.
	-	-	-	-	47.5		days			13			
Mitchell 1985 (picta)	-	-	-	-	71-76		days			2	c Virginia 1980-81	Grassy Swamp Lake	
Packard et al. 1983	-	-	1	-	49.2		days			80	Nebraska 1981	lab	Incubation conditions: (1) above wet substrate (2) above dry substrate (3) on wet substrate (4) on dry substrate substrate; Water potential = -130kPa (wet), -750kPa (dry).
	-	-	2	-	47.3		days			81			
	-	-	3	-	51.9		days			84			
	-	-	4	-	49.3		days			77			
Ratterman & Ackerman 1989	-	-	-	-	84.2		days	71	104	29	Iowa 1985-86	NS	
Ream 1967	-	-	1	-	95		days				Wisconsin	artificial	Temperature: (1) 21-23 C; (2) 25-25.5 C; (3) 25-25.5 C; (4) 29.5-30 C. Sample size is in eggs. As cited in Ewert 1979.
	-	-	2	-	74		days			69			
	-	-	3	-	71		days			69			
	-	-	4	-	51		days			18			
PERCENT NESTS SUCCESSFUL													
Breitenbach et al. 1984	-	-	-	WI	81.4		% nests/yr	20	100	43	Michigan 1977-82	terrestrial nests	Nest failures (18.6%) due to winter-kill; threshold temp. appears to be -3.3 C.
Snow 1982	-	-	-	-	59		% nests/yr			81	Michigan 1978	pond	Portion of nests lost to predation = 41 percent. Not all of the remaining necessarily hatched.

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Tinkle et al. 1981 (marginata)	-	-	-	-	67		% nests/yr			43	Michigan 1977-79	pond	Of the nests laid, predation caused failures of 21% per year (minimum of 10 and maximum of 27%). All causes resulted in 33% nests lost.
AGE AT SEXUAL MATURITY													
Cagle 1954 (marginata, dorsal)	-	M	1	-	1		year				United States	NS	(1) Southern U.S.; (2) northern U.S.
	-	M	2	-	2-3		years						
Christens & Bider 1986 (marginata)	-	F	-	-			years		12		Quebec, CAN 1983-85	pond	All females greater than 11 yrs of age reproduced in all 3 years.
Christens & Bider 1986 (marginata)	-	F	-	-	6		years				Quebec, CAN 1983-85	pond	
Christiansen & Moll 1973 (bellii)	-	F	-	-	5-6		years				New Mexico	NS	
	-	M	-	-	3		years						
Christiansen & Moll 1973 (bellii)	-	F	-	-	8		years				Wisconsin	NS	
	-	M	-	-	4		years						
Ernst & Barbour 1972 (picta)	-	M	-	-	5		years				Pennsylvania	NS	Plastron length = 80-90 mm.
	-	F	-	-	6		years						
Ernst 1971a,c	-	M	-	-	4		years				Pennsylvania	NS	Mean plastron length: (1) 80-90 mm for males; (2) 100 mm for females.
	-	F	-	-	4-6		years						
Mitchell 1985 (picta)	-	F	-	-	6-8		years				c Virginia 1980-81	Grassy Swamp Lake	
Moll 1973 (bellii)	-	M	-	-	2-3		years				Louisiana, Arkansas	NS	
	-	F	-	-	4		years				1969-72		
Moll 1973 (dorsalis x marginata)	-	M	-	-	2-3		years				Tennessee	NS	
	-	F	-	-	4-5		years				1969-72		
Moll 1973 (bellii x marginata)	-	M	-	-	3-4		years				c Illinois	NS	
	-	F	-	-	4-6		years				1969-72		

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Moll 1973 (bellii)	-	M	1	-	4-5		years				Wisconsin 1969-72	NS	
	-	F	2	-	7-8		years						
Pope 1939 (marginata)	-	M	-	-	5		years				New England	NS	As cited in DeGraaf & Rudis 1983.
	-	F	-	-	6-7		years						
Wilbur 1975a (marginata)	-	M	-	-	5		years				MI 1953-57,	pond	
	-	F	-	-	7		years				1968-73		
LENGTH AT SEXUAL MATURITY													
Cagle 1954 (marginata, dorsalis)	-	M	-	-	90		mm plastron				n Michigan	NS	
	-	F	-	-	120-130		mm plastron						
Cagle 1954 (marginata, dorsalis)	-	M	-	-	70		mm plastron				s Illinois	NS	
	-	F	-	-	120-125		mm plastron						
Christens & Bider 1986 (marginata)	-	F	BR	-	143	1.6 SD	mm plastron	124	158		Quebec, CAN 1983-85	pond	Significant difference in plastron length between reproductive and non-reproductive turtles > 6 yrs old.
	-	F	NB	-	135	1.7 SD	mm plastron	114	147				
Christiansen & Moll 1973 (bellii)	-	F	1	-	150		mm plastron	132	205	54	New Mexico 1964-70	NS	Minimum breeding age in (1) females - 5 to 6 years; (2) males - 3 years.
	-	M	2	-	123		mm plastron	88	170	55			
Christiansen & Moll 1973 (bellii)	-	F	1	-	154		mm plastron	136	185	23	Wisconsin	NS	Minimum breeding age in (1) females - 8 years; (2) males - 4 years.
	-	M	2	-	132		mm plastron	96	155	32			
Gibbons 1968a	-	M	-	-			mm plastron	81			Michigan 1964-66	lake, marsh	Growth rates vary in different habitats: male turtles from the marsh reach greater than 80 mm in about three to five years, while those in the lake habitat reach 80 mm in their sixth or seventh year. Females are thought to become mature between 110 and 120 mm in plastron length.
	-	F	-	-			mm plastron	110	120				
Gibbons 1968b	-	F	-	-			mm plastron	113	115		Michigan 1964-66	marsh	
MacCulloch & Secoy 1983 (bellii)	-	M	1	-			mm plastron	129		64	Saskatchewan, CAN	river,pond	Study from 1977 to 1979. Study locations: (1) Qu'Appelle (2) Rinfret. Measure = minimum plastron length at sexual maturity.
	-	M	2	-			mm plastron	115		12			

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Tinkle et al. 1981 (marginata)	-	F	-	-			mm plastro	112	155	107	se Michigan	near ponds	Plastron length at sexual maturity.
MORTALITY													
Ernst & Barbour 1972 (picta)	B	B	-	-	51		%/yr				Pennsylvania	NS	
Frazer et al. 1991	A	F	-	-			%/yr	50	71		Michigan	lake, marsh	Methodology may have underestimated survival rates.
	A	M	-	-			%/yr	17	36		1980-89		
	J	B	-	-			%/yr	49	79				
Mitchell 1988	A	B	-	-	54.0		%/yr	4	6		Virginia	NS	As cited in Frazer et al. 1991.
	J	B	-	-			%/yr						
Tinkle et al. 1981 (marginata)	B	B	-	-	24		%/yr				Michigan 1977-79	pond	
Wilbur 1975a (marginata)	J	B	1	-	92		%/yr				MI 1953-57, 1968-73	pond	(1) % mortality from laying to arrival of hatchlings at pond.
	B	M	-	-	15		%/yr						
	B	F	-	-	18		%/yr						
Zweifel 1989 CAN	A	F	-	-			%/yr	0	14		MI, NY, NE, Saskatchewan,	NS	As cited in Frazer et al. 1991.
	A	M	-	-			%/yr	2	46				
LONGEVITY													
Frazer et al. 1991	-	M	-	-			years		31		Michigan	marsh	
	-	F	-	-			years		34		1964-89		
Gibbons 1987	-	-	-	-			years	25+		18	Michigan	Sherriff's Marsh	Eighteen of 110 turtles were known to be older than 25 years (from mark-recapture).

*** SEASONAL ACTIVITIES ***

Reference	Begin	Peak	End	Location	Habitat	Notes
MATING Ernst 1971c	late Apr		mid Jun	se Pennsylvania 1965-67	pond, marsh	

Reference	Begin	Peak	End	Location	Habitat	Notes
Ernst & Barbour 1972 (picta)	Mar		mid Jun	NS	NS	
Gibbons 1968a	Mar	Apr-earl May	May	Michigan 1964-66	marsh, lake	Author suggests that a second ovulation (leading to second clutches), probably occurs in mid-June.
Gist et al. 1990		Oct		Ohio	ponds	Based on examination of oviducts for presence of sperm, and electroejaculation of males to detect presence of sperm.
Smith 1961 (marginata)		earl spring		Illinois	NS	
NESTING						
Cagle 1954 (marginata, dorsalis)	mid May		late Jul	Illinois 1937-43	creek	
Cagle 1954 (marginata, dorsalis)	earl Apr		late Jul	Louisiana 1946-51	NS	
Congdon & Gatten 1989	mid May	late May	earl Jul	Michigan 1976-86	marsh	
Ernst & Barbour 1972 (picta)	late May	late Jun	mid Jul	NS	NS	
Ernst 1971c	Jun		Jul	se Pennsylvania 1965-67	pond, marsh	
Moll 1973 (bellii)		Jun-earl Jul		Wisconsin 1969-72	NS	Nesting season.
Moll 1973 (bellii x marginata)		late May-Jun		Illinois 1969-72	NS	Nesting season.
Moll 1973 (dorsalis)	late May		late Jul	Louisiana 1969-72	NS	Nesting season.

Reference	Begin	Peak	End	Location	Habitat	Notes
Smith 1961 (marginata)	Jun		Jul	Illinois	NS	Mating in early spring.
Smith 1956 (bellii)	Jun		Jul	Kansas	terrestrial	Mating occurs in fall or spring with laying coming some time later.
Tinkle et al. 1981 (marginata)	late May	Jun	late Jun	se Michigan 1977-79	near ponds	
HATCHING						
Cahn 1937 (marginata)	Sep		spring	Illinois	NS	As cited in Smith 1961.
Ernst & Barbour 1972		Aug		NS	NS	Hatchlings from eggs laid in August may overwinter in the nest.
Smith 1956 (bellii)	Aug		Sep	Kansas	terrestrial	
Tinkle et al. 1981 (marginata)		late summer		se Michigan 1977-79	near ponds	
HIBERNATION						
Congdon et al. 1982 (marginata)	late Oct		late Mar	se Michigan	near ponds	End of hibernation ranges from late March to early April.
Ernst 1971c	late Oct		Mar	se Pennsylvania 1965-67	NS	
Smith 1956 (bellii)	late Oct		Apr	Kansas	mud underwater	

***** EASTERN BOX TURTLE *****

*** NORMALIZING AND CONTACT RATE FACTORS ***

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
BODY WEIGHT													
Allard 1948	H	B	1	SU	11		g			22	Tennessee	NS	Ages: (1) hatched in July; (2) 2 months old in Sept.; (3) 1.3 years old in October - overwintering lose 1 gram; (4) 1.8 years old in May; (5) 3.3 years old in October. As cited in Ernst and Barbour 1972.
	J	B	2	FA	21		g			-			
	J	B	3	FA	40		g			-			
	J	B	4	SP	39		g			-			
	J	B	5	FA	54		g			-			
Brisbin 1972 (carolina)	A	M	-	FA	397.8	46.8	SE g			13	Georgia	captive	Average of two years of data.
	A	F	-	FA	381.1	28.8	SE g			13	1965-67		
Brisbin 1972 (carolina)	A	M	-	SP	387.6	47.0	SE g			13	Georgia	captive	Average of two years of data.
	A	F	-	SP	369.1	29.4	SE g			13	1965-67		
	A	M	-	SU	394.0	42.7	SE g			14			
	A	F	-	SU	372.0	26.7	SE g			15			
Congdon & Gibbons 1985	A	F	-	-	372.0		g			8	S Carolina	NS	
	A	F	-	-	(129.0)		(mm plastron)			8			
BODY LENGTH													
Oliver 1955	H	-	-	-	28		mm carapace				NS	NS	As cited in Auffenberg and Iverson 1979.
	A	-	-	-			mm carapace		198				
BODY FAT													
Brisbin 1972 (carolina)	-	B	-	FA	0.058	0.014	SE g/g dry wt			5	Georgia	captive	Measure is grams of fat per gram of lean dry weight.
	-	B	-	SP	0.060	0.016	SE g/g dry wt			4	1965-67		
	-	B	-	SU	0.059	0.006	SE g/g dry wt			3			
EGG WEIGHT													
Congdon & Gibbons 1985	-	-	-	-	30.7	2.9	SE g/clutch			8	S Carolina	NS	Mean clutch size = 3.4 +/- 0.3 eggs.
Congdon & Gibbons 1985	-	-	-	-	9.02	0.17	SE g/egg			25	S Carolina	NS	Mean length of eggs = 35.60 +/- 0.37 mm; mean width of eggs = 20.70 +/- 0.15 mm.
Ernst & Barbour 1972	-	-	-	-			g/egg	6	11		NS	NS	Summarizing other studies.

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
HATCHING WEIGHT													
Ewert 1979 (major)	H	-	-	-	8.8		g			28	Florida	NS	From nine clutches.
Ewert 1979 (carolina)	H	-	-	-	8.4		g			74	Indiana	NS	From seventeen clutches.
GROWTH RATE													
Stickel & Bunck 1989 (carolina)	A	M	1	-	6.7		% mm/yr				Maryland	bottomland forest	Growth measured as percent increase in carapace length per year. Age: (1) 8-13 years; (2) 14-19 years.
	A	F	1	-	5.3		% mm/yr						
	A	M	2	-	2.3		% mm/yr						
	A	F	2	-	3.4		% mm/yr						
WATER INGESTION RATE													
Ernst & Barbour 1972	-	-	-	-	0.0072		g/g-day				NS	lab	Data source not identified. Evaporative water loss (which might need to be made up by drinking) at 10 to 29 C, relative humidity 45 to 95%.

*** DIET ***

Reference	Age	Sex	Food type	Spring	Summer	Fall	Winter	N	Location	Habitat - Measure	Notes
Klimstra & Newsome 1960 (carolina)	-	-	plant matter	35	39	20		115	w c s Illinois 1955-56	forest, prairie - % wet volume; digestive tract	Approximated from Figure 1. Season: spring = May; summer = June-August; fall = September, October.
			insects (adults)	18	12	12					
			insects (larvae)	4	5	9					
			seeds	8	16	33					
			Gastropoda	18	6	8					
			isopoda	<1	5	3					
			Diplopoda	3	2	5					
			mammals	2	<1	2					
			Decapoda	2	2	0					
			reptiles	1	3	1					
			birds	3	1	<1					
			Annelida	1	1	4					
others	5	8	2								
(sample size)	(33)	(56)	(26)								
Barbour 1950 (carolina)	-	-	snails		60			2	Kentucky	Cumberland Mountains - % volume; stomach contents	Younger individuals are chiefly carnivorous; older individuals are more herbivorous.
		crayfish		15							
		plants		12.5							
		crickets		7.5							
		unidentified seeds		5							

Reference	Age	Sex	Food type	Spring	Summer	Fall	Winter	N	Location	Habitat - Measure	Notes
Bush 1959 (carolina)	B	B	snails and slugs mushrooms caterpillars carabid beetles centipedes		53 10 10 4 4			10	Kentucky	NS - % volume; stomach contents	

*** POPULATION DYNAMICS ***

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
HOME RANGE SIZE													
Breder 1927	-	-	-	SU	1.13		ha	0.17	4.1	12	Long Island NY	NS	As cited in DeGraaf and Rudis 1983.
Dolbeer 1969 (carolina)	-	-	-	SU	0.46		ha				Tennessee	woodland	Foraging home range.
Nichols 1939b	-	-	-	SU	4.6		ha			62	Long Island NY	NS	Twenty year study; opportunistic sampling; "normal", not mean, value reported.
Schwartz et al. 1984 (triunguis)	B	B	-	-	5.1		ha			37	Missouri 1965-83	mixed woods, fields	Home range of adults is larger than that of juveniles. Average home range during first 6 years of the study = 2.1 ha, indicating that average home range size increased during the length of the study.
Stickel 1989 (carolina)	-	M	-	-	1.20		ha			51	Maryland 1945-75	bottomland forest	Calculated assuming an elliptical home range. Nesting sites tended to be distant from the home range, extending the range by 400 to 700 meters. Hibernacula, on the other hand, tended to be within the foraging home range.
	-	F	-	-	1.13		ha			52			
	-	M	-	-	146		48 SD m long			51			
	-	M	-	-	105		38 SD m wide			51			
	-	F	-	-	144		52 SD m long			52			
	-	F	-	-	100		38 SD m wide			52			
Stickel 1950 (carolina)	A	M	-	SU	0.79		ha				Maryland 1944-47	wooded bottomlands	Used spools of thread attached to back of turtle to help delineate home range size. Also mark-recapture.
	A	F	-	SU	1.0		ha						
	A	M	-	SU	101.0		42 SD m diameter						
	A	F	-	SU	113.0		45 SD m diameter						
Stickel 1950 (carolina)	A	F	BR	SU			meters		774		Maryland 1944-47	wooded bottomlands	Distance traveled from normal home range to lay eggs.
Strang 1983	-	-	-	-	2.2		ha				Pennsylvania	mixed woodlands	

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
POPULATION DENSITY													
Dolbeer 1969	-	-	-	-	17.3-22.2		N/ha			270	Tennessee	woodland	
Schwartz et al. 1984 (triunguis)	-	-	-	-	17-35		N/ha				Maryland 1965-83	forest	Lincoln Index population estimate - based on mark-recapture.
Stickel 1950 (carolina)	B	B	-	-	9.9-12.4		N/ha			245	Maryland 1944-47	wooded bottomlands	Juveniles comprise less than 10 % of the total population.
CLUTCH SIZE													
Cahn 1937	-	-	-	-			eggs	3	8		NS	NS	As cited in Smith 1961.
Congdon & Gibbons 1985	-	-	-	-	3.4	0.3 SE	eggs			8	S Carolina	NS	
Ernst & Barbour 1972	-	-	-	-	4.5		eggs	3	8		NS	NS	Summarizing other studies.
Smith 1956	-	-	-	-	4		eggs	2	7		Washington DC	NS	
CLUTCHES/YEAR													
Oliver 1955	-	-	-	-			/yr		4		Florida	NS	As cited in Moll 1979.
Smith 1961	-	-	-	-	1		/yr				Illinois	NS	
DAYS INCUBATION													
Allard 1948	-	-	-	-			days	64	136		NS	NS	As cited in Ernst and Barbour 1972.
Allard 1935 cited in Carr 1952	-	-	-	-	87-89		days				NS	NS	As cited in DeGraaf and Rudis 1983.
Allard 1935,1948	-	-	-	-	80-90		days	69	136		Maryland	NS	Days to emergence. As cited in Ewert 1979.
Dickson 1953	-	-	-	-	60		days				s Florida	natural	As cited in Ewert 1979.
Dodge et al. 1979 (carolina)	-	-	1	-	80		days				Iowa	lab	(1) At 24 C; (2) at 30 C.
	-	-	2	-	54		days						
Ernst & Barbour 1972	-	-	-	-	90		days				NS	NS	Summarizing other studies.

Reference	Age	Sex	Cond	Seas	Mean	SD/SE	Units	Minimum	Maximum	N	Location	Habitat	Notes
Ewert 1979	-	-	-	-			days	78	102		nw Minnesota	natural	Days to pipping.
Ewing 1933	-	-	-	-	99		days	69	161		Washington DC	natural	As cited in Ewert 1979.
Lynn & Von Brand 1945	-	-	1	-	63		days			12	Maryland	artificial	Temperature: (1) 25.0-25.5 C; (2) 25.0-25.5 C; (3) 30.0-32.0 C. N = number of eggs. As cited in Ewert 1979.
	-	-	2	-	76.0		days			12			
	-	-	3	-	50		days			12			
Rosenberger 1972	-	-	-	-			days	74	99		Pennsylvania	natural	Days to emergence. As cited in Ewert 1979.
AGE AT SEXUAL MATURITY													
Ernst & Barbour 1972	-	-	-	-	4-5		years				NS	NS	Summarizing other studies.
Minton 1972	-	-	-	-	5-10		years				NS	NS	As cited in DeGraaf and Rudis 1983.
LENGTH AT SEXUAL MATURITY													
Oliver 1955	A	B	-	-			mm carapace	100	130		NS	NS	As cited in Auffenberg and Iverson 1979.
LONGEVITY													
Nichols 1939a	-	-	-	-	20		years		80		NS	NS	
Oliver 1955	-	-	-	-			years		138		NS	captive	As cited in Auffenberg and Iverson 1979.

*** SEASONAL ACTIVITIES ***

Reference	Begin	Peak	End	Location	Habitat	Notes
MATING/LAYING						
DeGraaf & Rudis 1983	Jun		Jul	ne Carolinas	NS	
Ernst & Barbour 1972		spring		northern range	NS	
Smith 1956	Jun		Jul	Washington DC	NS	

Reference	Begin	Peak	End	Location	Habitat	Notes
HATCHING						
DeGraaf & Rudis 1983	Aug		Sep	ne Carolinas	NS	
Ernst & Barbour 1972	Sep		Oct	northern range	NS	
Smith 1956		Sept		Washington DC		
HIBERNATION						
Ernst & Barbour 1972	Nov		Apr	northern range	NS	
Schwartz & Schwartz 1974 (triunguis)	Oct		Apr	Missouri	mixed woods, fields	